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# METHOD OF APPLICATION MENU SELECTION AND ACTIVATION USING IMAGE COGNITION

## BACKGROUND OF THE INVENTION

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### 1. Field of the Invention

The present invention relates to a method of selecting and activating an application menu, and more particularly, to an improved method of application menu selection and activation through image cognition, wherein a menu is selected and activated in correspondence to a user's motion while the motion image of the user is recognized at real time by an image-capturing device such as a camera.

### 2. Description of the Background Art

In order to select and activate a particular item from a list of application menu being displayed on a monitor screen, a computer generally adopts an input device, such as keyboard, mouse and touchpad.

Under a touch-screen method, the moment a user touches directly by hand a desired menu item among the menu list displayed on the monitor screen, the menu item becomes activated.

As another example, a pointer type wireless control device is employed to select and activate a menu list using an infrared transmission device. Such a pointer type wireless control device is provided with a plurality of sensors at corner portions of a monitor and it calculates a phase difference using an infrared signal being generated from a transmission unit, and accordingly coordinate

values are obtained so that a transmitter may move the pointer to a desired position, thereby selecting and activating the required menu item.

However, such a conventional technology requires an additional, external device for the menu selection and activation.

5 Further, in case of a touch-screen and a pointer type wireless control device, there should be disadvantageously provided a plurality of sensors at corner portions of the monitor.

## SUMMARY OF THE INVENTION

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The present invention is directed to solving the conventional disadvantages.

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Accordingly, it is an object of the present invention to provide a method of application menu selection and activation using image cognition which is capable of selecting and activating a menu list in response to a user's motion or a particular device movement while recognizing a user's image at real time by use of an image-capturing device such as a camera.

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According to an embodiment of the present invention, using an image-capturing device such as a camera attached to a system, a user's image is recognized at real time and displayed on an initial screen of a monitor. The user makes a direct hand motion while viewing his own image displayed on the initial screen, and when a desired menu icon is designated among a variety of menu icons arrayed on the initial screen, the system guides the user's hand image to the corresponding menu icon for its selection. When the user makes a particular body motion to activate the selected menu, the system recognizes the motion for thereby activating the selected menu.

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In the above-described embodiment, a pattern wearable on a finger may be employed so as to accurately recognize a user's specific motion. When the user indicates a desired menu icon wearing the pattern on his finger, the system guides the user's hand image on the screen to move toward the corresponding 5 menu icon for the menu selection. As described in the above-described embodiment, when the user makes a particular body motion to activate the selected menu, the system recognizes the motion for thereby activating the selected menu.

According to another embodiment of the present invention, a particular 10 pattern grabbable by a user is employed. When the user indicates a desired menu icon, the system guides the user's hand image displayed on the screen to move to the corresponding menu icon for its selection, and when the user operates a menu activating member provided in the pattern itself, the system responds, whereby the selected menu becomes activated.

The object and advantages of the present invention will become more 15 readily apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific example, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the 20 invention will become apparent to those skilled in the art from this detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 The present invention will become better understood with reference to the

accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein:

Figure 1 is a schematic view for realizing an image cognition system according to the present invention;

5       Figure 2 is a flow chart illustrating steps for selecting and activating an application menu using an image cognition according to a first embodiment of the present invention;

10      Figure 3 is a flow chart illustrating steps for selecting and activating an application menu using an image cognition according to a second embodiment of the present invention;

Figure 4A is a view illustrating a ring-type pattern applicable to the first embodiment of the present invention;

Figure 4B is a view illustrating a rod-type pattern applicable to the second embodiment of the present invention;

15      Figure 5 is a schematic view for illustrating a user's image together with a plurality of menu lists displayed on a system monitor, wherein the user's image is positioned on the central portion of the monitor screen; and

20      Figure 6 is a schematic view for illustrating a user's image together with a plurality of menu lists displayed on a system monitor, wherein the user's image is positioned on a corner portion of the monitor screen.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 is a schematic view illustrating an apparatus for realizing the present invention. As shown therein, the apparatus according to the present

invention includes a camera 1 for capturing a user's image, and a system 2, such as a personal computer and an HDTV set, for digital-processing the images captured by the camera 1.

On the initial screen serving as a client's window region, there are displayed a plurality of menu lists in type form of icons I1, I2, I3,...,I6. A user's image is displayed on the entire initial screen together with the menu lists.

The menu icons I1, I2, I3,...,I6 are displayed on the left of the screen, and the dotted squares B1, B2, B3,..., B6 enclosing the icons I1, I2, I3,...,I6, respectively, are pattern regions for pattern cognition and they do not appear on the real screen.

Figure 2 is a flow chart illustrating steps for selecting and activating an application menu using an image cognition according to a first embodiment of the present invention.

When the system 2 starts operation, the user's image captured by the camera 1 is displayed on the monitor screen. Accordingly, the user can view his own image being displayed on the screen as shown in Figure 1 (Step S21). Likewise, as the user's own image is displayed on the screen, the user can easily notice his hand's location while feeling he stands in front of a mirror.

Then, following the hand's movement of the user, a menu icon will be selected and the selected menu icon will be activated and the relevant steps will now be described.

When the user moves his hand toward the region of menu icons I1, I2, I3,..., I6, the user's hand image on the screen also moves toward the menu icons. In the meantime, the system 2 continuously checks up the screen color within the plurality of patterns regions B1, B2, B3,...,B6 (Step S22). Since the user's hand

is flesh color and the screen background color is not so, when the user moves his hand to a certain pattern region B2, the color in the pattern region B2 changes to flesh color. The system 2 checks up whether the screen color within the pattern regions B1, B2, B3,...,B6 is converted to flesh color, thereby determining that the  
5 user's hand is positioned on a particular menu icon (Step S23).

In Figure 1, the user's hand is positioned in the second pattern region B2. Likewise, when the user's hand moves into the particular pattern region B2 selected from the plurality of pattern regions B1, B2, B3,...,B6, the system 2  
10 recognizes that the pattern region B2 has been selected by the user to thereby convert the color of the menu icon I2. Accordingly, the user recognizes that the menu icon I2 being indicated by himself has been selected (Step S24).

In the next step, if the user nods his head, the system 2 recognizes the nodding through a gesture cognition device provided within the system 2 and accordingly activates the selected menu icon I2 (Steps S25, S26).

15 Meanwhile, in order for the system to recognize the user's gesture, there should be provided a pattern cognition using a moving image. That is, the system continuously captures the user's image and the captured moving image is pre-processed, and the previously captured image is compared with the presently captured image so as to extract characteristics of the two images, whereby the  
20 nodding of the user's head can be determined on the ground of the extracted characteristics.

The method in the above-described embodiment is to activate menu by  
recognizing the user's gesture. Here, the menu activation can be also performed when a particular pattern stays within a certain pattern region for a certain time  
25 period. Here, by adding a function to the system, the stationed time period of the

particular pattern may be counted so that if a predetermined time lapses the menu becomes activated.

In the selection mode of the menu using the hand motion recognition of the user, there may occur an error operation in the result of erroneous recognition in which a hand motion of the user is mistaken for an arm motion due to the inaccurate recognition of the system. In order to overcome such an erroneous operation of the system, a simple type of pattern can be worn on a user's finger.

As shown in Figure 4A, a ring type pattern is provided to be worn on a user's finger. Accordingly, the user's hand with the ring type pattern worn on the finger enables the system to accurately select a desired menu item displayed on the initial screen without error, in response to the pattern motion.

As further shown in Figure 4B, the second embodiment of the present invention allows the user to grab the rod type pattern, and the user selects a desired menu item and activates the selected menu item by driving a menu activating member provided in the rod type pattern.

The indication rod as shown in Figure 4B includes a body 11 grabbable by the user, a first pattern portion 12 formed on an end of the body 11, a second pattern portion 13 disposed at an outer end of the first pattern portion 12 and guidable through the first pattern portion 12, and a button 14 for guiding the second pattern portion 13 into and out of the first pattern portion 12. Here, the indication rod illustrated on the left in Figure 4B denotes a state before the button 14 is pressed, and that on the right denotes a state at which the second pattern portion 13 is exposed from the first pattern portion 12 in correspondence to the pressing of the button 14.

With reference to Figures 1 and 3, the application menu selection method

using image cognition together with the indication rod will now be described.

First, the data with regard to the first pattern portion 12 and the second pattern portion 13 are set in the system.

Step S31 is identical to Step S21 in Figure 2. In Step S32, the user moves 5 the indication rod while viewing his own image displayed on the monitor screen, so that the first pattern portion 12 at the end of the indication rod can reach toward the pattern region B2 on the left side of the screen. At this time, the system checks up the color within the plurality of pattern regions B1, B2, B3,..., B6 (Step S32). Since the data responding to the first pattern portion 12 are already stored in the system, it can be determined whether the background color 10 within the pattern regions B1, B2, B3,..., B6 is converted to a color corresponding to the first pattern portion 12 (Step S33). In case the first pattern portion 12 of the indication rod is moved into the pattern region B2, the system recognizes the first pattern portion 12 and converts color of the menu icon I2, whereby the user 15 recognizes that a desired menu item is selected.

Next, when the button 14 of the indication rod is pressed by the user, the second pattern portion 13 is externally exposed from the first pattern portion 12. When the exposure of the second pattern portion 13 is detected by the system, the selected menu icon I2 becomes activated. Likewise, if there is employed such 20 an indication rod having the first and second pattern portions, the system does not require such a gesture cognition function as described in the first embodiment of the present invention.

In Figures 5 and 6, the user's image and a menu composition are displayed on the monitor screen of the systems 52, 62, which are easily applicable to 25 electronic devices, for example, employed in karaoke.

As shown in Figure 5, a predetermined size of image block 53 arrayed on the central portion of the entire screen is set to display the user's image, and a plurality of menus with song titles are displayed on each side of the image block 53. A pattern region 54 is set at inner ends of the song titled portions approaching the image block 53.

When the user moves his hand leftward to select a menu, the system 52 recognizes the leftward motion so that the hand in the user's image displayed in the image block 53 makes a leftward movement, and accordingly the user's desired menu is selected by checking up the screen color of the pattern region 54.

Figure 6 shows a different composition from Figure 5, with regard to the image and menus being displayed on the monitor screen of the system 62. An image block 63 which is similar to the image block 53 is positioned at a corner portion of the screen, and a pointer 64 is displayed on the rest of the initial screen.

When the user moves his hand, the user's image is displayed inside the image block 63 and the system causes the pointer 64 to move in response to the user's hand movement. Here, the pointer serves as a mouse pointer mainly employed in the window's operating system in a computer.

The method of menu selection and activation using image cognition according to the preferred embodiments of the present invention may also replace the mouse-oriented menu selection and activation in prevalent window system computers.

As the present invention may be embodied in several forms without departing from the spirit of essential characteristics thereof, it should also be

understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to embrace the appended claims.

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